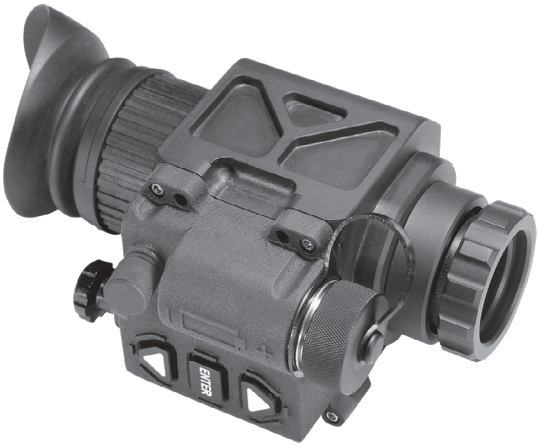
ATN OTS-X Series

THERMAL IMAGING VIEWERS



OPERATOR'S MANUAL (OTS-X) REVISION 5 – SEPT. 2014

operator's manual

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AMERICAN TECHNOLOGIES NETWORK CORP.

Register your product warranty online at www.atncorp.com/warranty

Manual (OTS-X) Revision 5 – September, 2014

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SAFETY SUMMARY

STUDY CAREFULLY THIS MANUAL BEFORE TURNING ON AND OPERATING THIS PRODUCT.

CAUTIONS

The ATN OTS-X thermal imaging viewer are precision optical-electronic instruments and requires careful handling. To provide safe use of the systems the following instructions should be observed:

- Do not dismantle the device.
- Keep the device clean; protect it from moisture, sharp temperature drops and shocks.
- Be careful not to touch the glass surfaces. If you put fingerprints on, or contaminate the glass surfaces, use only clean and soft materials to clean it.
- Do not leave the device in on position during stops in operation.
- Remove the battery from the device for the period of storage.

CAUTION:

THIS PRODUCT CONTAINS NATURAL RUBBER LATEX WHICH MAY CAUSE ALLERGIC REACTIONS

WARNING

Do not permanently attach the device to dynamic-mount applications that continuously transmit vibration (such as on vehicles or heavy machinery).

WARNING

Do not point the monocular directly at any high-intensity objects that you must not view with your eyes (such as the sun or a welding arc). If you do, you will damage the camera.

WARNING

Operating OTS-X outside of its specified operating temperature range or voltage range can cause permanent damage and will void the warranty.

WARNING

Use the power switch to turn the camera off before you remove power (remove battery).

WARNING

Do not use any battery other than a CR-123A lithium battery. DO NOT use any battery(ies) providing a (combined) voltage greater than 3.0 volts.

WARNING

Do not replace battery in a possibly explosive environment, such as a gas station (or any place where you must turn off your vehicle engine). If you do, sparks can cause an explosion.

WARNING

Remove the battery before you store the camera for extended periods (2 weeks or more).

WARNING

Do not carry battery in pockets containing metal objects such as coins, keys, etc. Metal objects can cause the battery to short circuit and become very hot. In the case of lithium batteries, a short circuit could cause them to explode.

WARNING

Observe battery manufacturer's guidelines for safe handling and proper disposal of batteries.

NOTE

Please be aware that the most common problem that first time users of Thermal products encounter is improper utilization of Calibrate/NUC function. The first step before using the product should be to properly calibrate the device. To do this please turn the unit on, close the objective lens with the lens cap and press the Calibrate/NUC function either as described in 3.2.2.3 or by holding down both the UP and DOWN buttons at the same time. Please carefully read 3.2.2.3 as to additional information on Calibration/NUC function.

EQUIPMENT LIMITATIONS

• The OTS-X detector spectral band (7 to 14 μm) provides a better penetration through smoke, smog, dust, water vapor etc.

• Infrared radiation does not travel through glass and therefore the monocular does not sense objects if they are behind a glass window.

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HOW TO USE THIS MANUAL

- **Usage**

You must familiarize yourself with the entire manual before operating the equipment. Read and follow all warning notices.

- **Manual Overview**

The table of contents includes the paragraph number, paragraph title, and page number.

CHAPTER 1

INTRODUCTION

1.1 GENERAL INFORMATION

1.1.1. SCOPE

This manual contains instructions for use in operating and maintaining the ATN OTS-X thermal imaging viewer. Throughout this manual, the ATN OTS-X will be referred to as the scope or OTS-X.

1.1.2. REPORTS

Reports from the user on recommendations for improvements are encouraged. Send reports to the address below.

American Technologies Network Corp.
1341 San Mateo Avenue
South San Francisco, CA 94080
(800) 910-2862
(650) 989-5100
(650) 875-0129 fax
info@atncorp.com
www.atncorp.com

1.1.3. STORAGE

Storage of OTS-X should be done in the factory packing and after a thorough PMCS as outlined in Section 4.1. of this manual. This will ensure the scope remains in mission ready condition during storage. Battery should be stored separately from the scope.

The scope should not be placed on the floor, in any area exposed to high temperatures or direct sunlight. Presence of acid and alkaline vapor, as well as of other aggressive admixtures in the air is unacceptable.

1.1.4. WARRANTY INFORMATION

NOTICE:

All OTS-X models with manufacture date post January 1, 2014 are warranted by the following:

3 YEAR PRODUCT WARRANTY

This product is guaranteed to be free from manufacturing defects in material and workmanship under normal use for a period of 3 (three) years from the date of purchase. In addition the uncooled thermal sensor array carries a 10

year warranty. In the event a defect that is covered by the foregoing warranty occurs during the applicable period stated above, ATN, at its option, will either repair or replace the product, and such action on the part of ATN shall be the full extent of ATN's liability, and the Customer's sole and exclusive remedy. This warranty does not cover a product (a) used in other than its normal and customary manner; (b) subjected to misuse; (c) subjected to alterations, modifications or repairs by the Customer of by any party other than ATN without prior written consent of ATN; (d) special order or "close-out" merchandise or merchandise sold "as-is" by either ATN or the ATN dealer; or (e) merchandise that has been discontinued by the manufacturer and either parts or replacement units are not available due to reasons beyond the control of ATN. ATN shall not be responsible for any defects or damage that in ATN's opinion is a result from the mishandling, abuse, misuse, improper storage or improper operation, including use in conjunction with equipment which is electrically or mechanically incompatible with or of inferior quality to the product, as well as failure to maintain the environmental conditions specified by the manufacturer. This warranty is extended only to the original purchaser. Any breach of this warranty shall be waived unless the customer notifies ATN at the address noted below within the applicable warranty period.

The customer understands and agrees that except for the foregoing warranty, no other warranties written or oral, statutory, expressed or implied, including any implied warranty of merchantability or fitness for a particular purpose, shall apply to the product. All such implied warranties are hereby and expressly disclaimed.

LIMITATION OF LIABILITY

ATN will not be liable for any claims, actions, suits, proceedings, costs, expenses, damages or liabilities arising out of the use of this product. Operation and use of the product are the sole responsibility of the Customer. ATN's sole undertaking is limited to providing the products and services outlined herein in accordance with the terms and conditions of this Agreement. The provision of products sold and services performed by ATN to the Customer shall not be interpreted, construed, or regarded, either expressly or implied, as being for the benefit of or creating any obligation toward any third party of legal entity outside ATN and the Customer; ATN's obligations under this Agreement extend solely to the Customer.

ATN's liability hereunder for damages, regardless of the form or action, shall not exceed the fees or other charges paid to ATN by the customer or customer's dealer. ATN shall not, in any event, be liable for special, indirect, incidental, or consequential damages, including, but not limited to, lost income, lost revenue, or lost profit, whether such damages were foreseeable or not at the time of purchase, and whether or not such damages arise out of a breach of warranty, a breach of agreement, negligence, strict liability or any other theory of liability.

PRODUCT WARRANTY REGISTRATION

In order to validate the warranty on your product, ATN must receive a completed Product Warranty Registration Card for each unit or complete warranty registration on our website at www.atncorp.com. Please complete the included form and immediately mail it to our Service Center: ATN Corporation, 1341 San Mateo Avenue, South San Francisco, CA 94080.

OBTAINING WARRANTY SERVICE

To obtain warranty service on your unit, End-user must notify ATN service department by calling 800-910-2862 or 650-989-5100 or via e-mail service@atncorp.com to receive a Return Merchandise Authorization number (RMA).

When returning please take or send the product, postage paid, with a copy of your sales receipt to our service center, ATN Corporation at the address noted above. All merchandise must be fully insured with the correct postage; ATN will not be responsible for improper postage or, missing or damaged merchandise during shipment.

When sending product back, please clearly mark the RMA# on the outside of the shipping box. Please include a letter that indicates your RMA#, Name, Return Address, reason for service return, Contact information such as valid telephone numbers and/or e-mail address and proof of purchases that will help us to establish the valid start date of the warranty. Product merchandise returns that do not have an RMA listed may be refused or a significant delay in processing may occur. Estimated Warranty service time is 10-20 business days. End-user/customer is responsible for postage to ATN for warranty service. ATN will cover return postage/shipping to continental USA end-users/customers after warranty repair only if product is covered by aforementioned warranty. ATN will return product after warranty service by domestic ground service and/or domestic mail. Any other requested, required or international shipping method the postage/shipping fee will be the responsibility of the end-user/customer.

1.2 EQUIPMENT DESCRIPTION

1.2.1. EQUIPMENT CHARACTERISTICS, CAPABILITIES AND FEATURES

The OTS-X Series is one of the smallest Thermal Imaging Monocular Systems today. It features extremely small size and low weight because of its advanced construction and characteristics using the latest technologies in high grade polymers to make a Mil. Spec.

The OTS-X series is a thermal system using the latest in miniature thermal sensor technology combined with an advanced Display to provide a superior stable image in a compact and rugged package. The system also includes an array of features that help the user to enhance the sight to meet all of their requirements.

The OTS-X system is designed for hand held operations. The OTS-X is one of the most capable thermal monocular systems on the market.

WITH 14 MM LENS

WITH 30 MM LENS

WITH 50 MM LENS

WITH 70 MM LENS

FIGURE 1.1. OTS-X SERIES

1.2.2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

Included and optional items are shown in Figure 1.1.

FIGURE 1.2. COMPONENTS OF OTS-X WITH 14 MM LENS

The monocular (see Figure 1.2.) consists of various components such as an objective lens, a thermal core (not shown), an eyepiece lens and a battery cap.

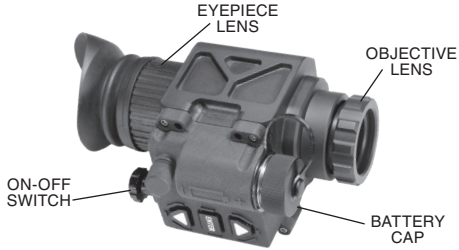

FIGURE 1.3. THERMAL IMAGING MONOCULAR SYSTEM

1.2.3. SPECIFICATIONS

The following tables provide information pertaining to the operational, electrical, mechanical, optical and environmental characteristics for the monocular.

Table 1-1. Specifications

ITEM	OTS-X S/F/E-314	OTS-X S/F/E330	OTS-X S/F/E-350	OTS-X S/F/E-370	OTS-X S/F-614	OTS-X S/F-630	OTS-X S/F-650	OTS-X S/F-670
Sensor (microbolometer)	336x256				640x512			
Type	Uncooled							
Material	Vanadium oxide (Vox)							
Image Size (output resolution), px	800x600							
Frame rate, Hz	9 or 30 or 60*				9 or 30*			
Video output	Analog RS-170							
Lens, mm	14	30	50	70	14	30	50	70
Display	Color matrix, SVGA< 800x600							
Thermal Sensitivity, mK	<50							
Spectral Response, µm	7-14							
Field of View, deg	25	11	7	4.5	45	22	14	9
Diopter Adjustment	-1.5							

ITEM	OTS-X S/F/E-314	OTS-X S/F/E330	OTS-X S/F/E-350	OTS-X S/F/E-370	OTS-X S/F-614	OTS-X S/F-630	OTS-X S/F-650	OTS-X S/F-670
Optical Magnification	1x	2x	4x	6x	0.5x	1.5x	2.5x	3.5x
Human Detection, m	500	750	1300	1800	500	750	1300	1800
Human Recognition, m	225	300	500	700	225	300	500	700
Human Identification, m	135	180	320	460	135	180	320	460
Vehicle Detection, m	1100	1650	2800	3800	1100	1650	2800	3800
Vehicle Recognition, m	495	660	1100	1400	495	660	1100	1400
Vehicle Identification, m	300	400	700	1000	300	400	700	1000
Polarity control	White hot / Black hot / Multiple Color Modes							
Start up time, s	<4							
Waterproof	yes	yes	yes	yes	yes	yes	yes	yes
Battery type	1 x CR123A battery type							
Battery Life, hrs	2+							
Dimensions, mm/inc	100x61x83 /4x2.4x3.3	145x61x83 /5.75x2.4x3.3	165x61x83 /6.5x2.4x3.3	177x76x83 /7x3x3.3	100x61x83 /4x2.4x3.3	145x61x83 5.75x2.4x3.3	165x61x83 /6.5x2.4x3.3	177x76x83 /7x3x3.3
Weight, lb/gr	0.83/375	1.1/500	1.4/640	1.75/800	0.83/375	1.1/500	1.4/640	1.75/800

* ATN reserves the right to change the above specifications at any time without notice

1.2.4. MECHANICAL FUNCTION

The mechanical adjustments of the OTS-X sights allow for physical differences between individual operators using the system. The scope functions include the ON-OFF switch, UP button, ENTER button, DOWN button, video-out, eyepiece diopter adjustment ring, battery compartment cover. The mechanical controls are identified in Figure 1.4.

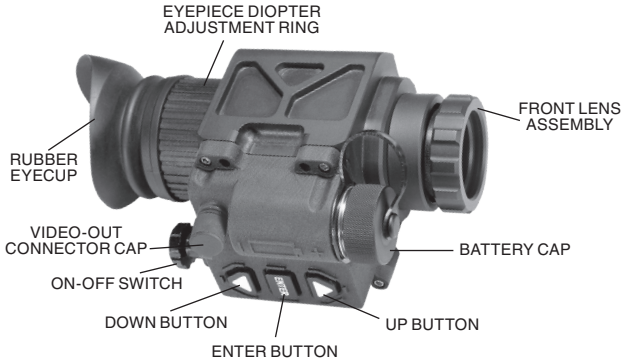

FIGURE 1.4. MECHANICAL CONTROLS

1.2.5. OPTICAL FUNCTIONS

The optical functions include an objective lens, thermal imaging detector and eyepiece. Infrared energy is emitted proportionally to the temperature of an object. The warmer the object, the more energy it emits. The infrared energy from the objects is focused by the optics, onto an infrared detector. The information from infrared detector is passed to electronics for image processing. The signal processing circuitry translates the infrared detector data into an image that can be viewed on the built-in display. The image is observed through an eyepiece by operator.

1.2.6. ELECTRICAL FUNCTION

The electronic circuit is powered by replaceable battery – one 3 V Lithium battery (CR123A type battery).

Power from the battery is supplied to the components through the OFF-ON switch.

CHAPTER 2

ASSEMBLY AND PREPARATION

2.1. PREPARATIONS

2.1.1. PREPARATION FOR USE

This chapter contains the information necessary to prepare the scope for operation. This includes unpacking, examination for damage, and battery installation.

A. UNPACKING

The following steps must be accomplished prior to each mission where the sight is used.

1. Open carrying case, remove the scope and check contents for completeness.
2. Inspect the scope for obvious evidence of damage to optical surfaces, body, eyecups, operation buttons, etc. Ensure that all optical surfaces are clean and ready for use. Clean with lens paper.

B. ATTACHMENT OF NECK LANYARD

To prevent damage due to dropping the scope, use the neck lanyard included with your equipment.

C. INSTALLATION OF BATTERY

WARNING

The lithium battery contains sulphur dioxide gas under pressure.

Do not heat, puncture, disassemble, short circuit, attempt to recharge or otherwise tamper with the batteries.

Turn off equipment if battery compartment becomes unduly hot. If possible, wait until the batteries have cooled before removing them.

If you inhale sulphur dioxide, seek medical attention.

The OTS-X will operate with one CR123A Lithium battery type.

CAUTION

Make certain the operation switch is in the OFF position before installing batteries.

Install CR123A Lithium batteries as follows.

1. Remove the battery cap by turning it counterclockwise.
2. Check to ensure the o-ring is present. If not, replace it.
3. Observe polarity, as indicated on the outside of the battery compartment and insert one 3.0 Volt CR123A Lithium battery into the battery compartment, minus (-) end first (Figure 2.1.).
4. Replace battery cap by pushing and turning it clockwise. Tighten it firmly to ensure a watertight seal.

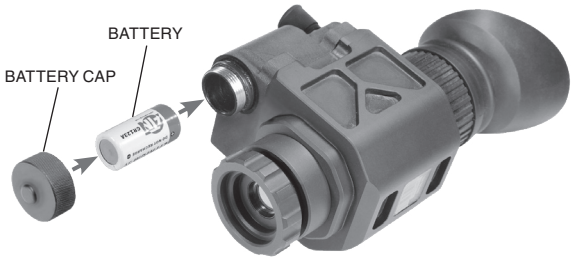

FIGURE 2.1. BATTERY INSTALLATION

CHAPTER 3

OPERATION

3.1. GENERAL INFORMATION

3.1.1. GENERAL

This section contains instructions for operation of OTS-X. The function of controls and indicators is explained.

CAUTION

The OTS-X scope is a precision electron-optical instrument and must be handled carefully at all times.

3.1.2. CONTROLS AND INDICATION

The OTS-X scope is designed to adjust for different users and corrects for most differences. The controls for the scope are shown or described in Figure 3.1. and Tables 3-1.

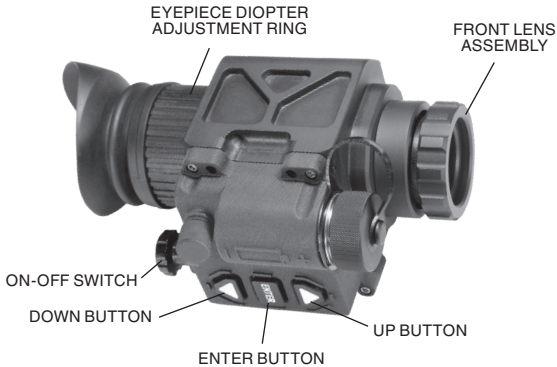

FIGURE 3.1. CONTROLS

Table 3-1. Controls and Indication

ITEMS	CONTROLS AND INDICATORS	FUNCTIONS
1	ON-OFF Switch	Locate the rotary switch next to the eyepiece of the OTS-X. Simple rotate clockwise to turn on the monocular and allow 4 s for the system start-up. To turn off rotate the switch counterclockwise.
2	UP and DOWN Buttons	Navigating the menu.
3	ENTER Button	Choosing of menu set.
4	Objective Lens Focus	Focus adjustment.
5	Diopter Adjustment	Focuses eyepiece lens without the need for glasses. Adjusts for sharper image of intensifier screen.

3.2. OPERATING PROCEDURE

This section contains operating procedures for using the OTS-X as hand-held monocular. Prior to operating the monocular, make certain that all the steps in 2.3.3. Assembly and Preparation for Use, have been read and performed.

3.2.1. TURNING ON

Open the objective lens cover. The objective lens cover protects the monocular from inadvertent exposure to extremely high levels of radiant flux. Never leave the monocular with the objective lens cover off. To turn the unit on rotate clockwise the ON/OFF switch. After a warm-up time of approximately 4 seconds, video of the thermal scene appears.

3.2.2. MENU SETS

The first set of menus appears when you turn on the device. For menu change press ENTER button to cycle through the available menu sets. Each menu contains two icons that indicate various scope functions. To access a particular icon please use UP or DOWN buttons.

FIGURE 3.2. OPERATIONAL BUTTONS OF OTS-X

3.2.2.1. FIRST MENU SET

The two icons on the screen are **Zoom** (on top) accessed by UP button and **White Hot/Black Hot** (on the bottom) accessed by DOWN button.

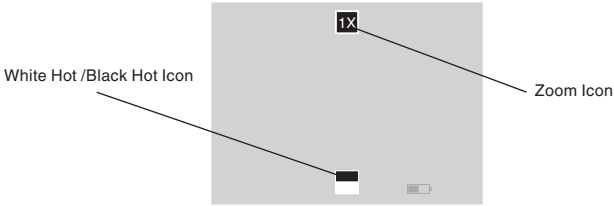

FIGURE 3.3. SCREEN OF FIRST MENU SET

Zoom – UP button will allow the user to cycle through all the zoom options. The icon will change based on the Electronic Zoom level that you have selected. (Note: The Electronic Zoom [E-Zoom] is not the same as overall system magnification. To calculate system magnification you must multiply E-Zoom by Optical Magnification. Example: OTS-X 30 mm has an optical magnification on 2X. When used in 1X E-Zoom mode your system overall magnification is 2X [2 x 1=2]. However, when E-Zooming to 2X your system magnification will be 4X [2 x 2=4] and when E-Zooming to 4X your system magnification will be 8X [2 x 4=8].)

White Hot/Black Hot – DOWN button will allow the user to cycle between White Hot Polarity and Black Hot Polarity. When in White Hot mode, the hotter the object the whiter it will appear on the display. In Black Hot the opposite will be true – the hotter the object the darker it will appear. We recommend you try both modes in various environments/situations to determine the optimal mode.

3.2.2.2. SECOND MENU SET

The two icons on the screen are **Color Mode** (on top) accessed by UP button and **Screen Brightness** (on the bottom) accessed by DOWN button.

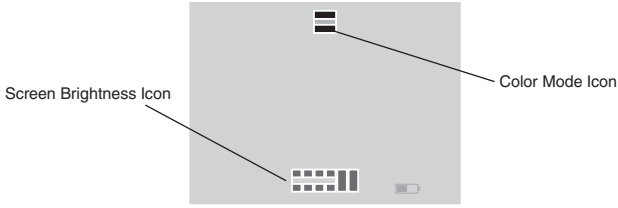

FIGURE 3.4. SCREEN OF SECOND MENU SET

Color Mode – UP button will let the user cycle through various color modes. We recommend that you experiment in various environments/situations to determine which mode works best for you.

Screen Brightness – DOWN button will let the user cycle through display brightness levels. The icon will change to indicate the level of brightness that was chosen.

3.2.2.3. THIRD MENU SET

The two icons on the screen are **Rotate** (on top) accessed by UP button and **Calibrate/NUC** (on the bottom) accessed by DOWN button.

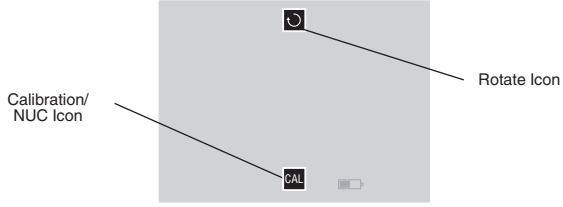

FIGURE 3.5. SCREEN OF THIRD MENU SET

Rotate – UP button will let the user cycle through the screen rotation. This feature offers valuable options to the user in enabling the scope to be used for various purposes. Example: When worn on a headgear/helmet for the left eye (vs more standard right eye approach) the Rotate feature will enable the user to rotate the icons 180 degrees to achieve the proper icon positioning.

Calibrate/NUC – DOWN button will let you Calibrate/NUC the system. Calibrating or NUCing a thermal system is needed when a user detects degradation of the image (image blurring or a burn in effect). This is a normal part of a thermal sensor functionality and is caused by a charge accumulation on the detector array. Most often this will occur when the device is used in an environment with large temperature variations (example: moving from a warm house to a cold outdoor environment). Calibration is needed less when used outdoors at night where temperature variations are less frequent.

To properly Calibrate/NUC the system, user must cover the objective lens either with a lens cap or any other object of uniform temperature (most often even a user's hand will do). Only when the lens is covered the Calibrate feature may be activated. In the event the Calibrate feature is activated and the lens is not covered - the device may experience even a worse degradation as heat sources viewed by the device during calibration are burn-in to the sensor.

NOTE

The burn-in is temporary and causes no permanent damage to the unit.

There are two ways to access Calibrate/NUC function. First is through the 3rd Menu Set as explained above. Second is the Quick Calibration Option – Press both the UP and DOWN keys simultaneously and unit will Calibrate/NUC.

3.2.2.4. FOURTH MENU SET

For the Fourth Menu Set all icons are removed from the screen allowing optimal uncluttered viewing.

The UP and DOWN buttons will still function in the same way as on First Menu Set. UP button will activate **Zoom** and DOWN button will activate **White Hot/Black Hot** function.

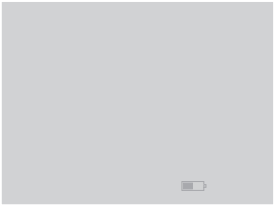

FIGURE 3.6. SCREEN OF FOURTH MENU SET

3.2.3. VIDEO OUTPUT

This version of the OTS-X is equipped with the added feature of being able to connect directly to a remote video monitor or recorder via an integrated 8 PIN port.

This version of the OTS-X is equipped with the added feature of being able to connect directly to a remote video monitor or recorder via an integrated 8 PIN port.

To use this feature, the following optional components are required (see illustrations below):

1. 8 PIN-to-BNC adapter.

FIGURE 3.7. VIDEO CABLE WITH 8 PIN TO RCA

2. BNC Plug to RCA Jack Adapter

FIGURE 3.8. RCA JACK ADAPTER

3. RCA style video cables

FIGURE 3.9. RCA CABLES

Connection Setup:

1. Connect the 8 PIN-to-BNC (Figure 3.7.) cable to the sights 8 PIN port.
2. Connect the BNC Plug to RCA Jack Adapter (Figure 3.8.), to the 8 PIN-to-BNC cable.
3. Connect the Yellow (video) plug of the RCA Cables (Figure 3.9.), to the RCA jack adapter.
4. Connect the opposite end of the yellow male RCA cable to the monitor's yellow RCA plug.

Operation:

1. Turn on the system by pressing the POWER button.
2. Let screen image settle before transferring video to the monitor.
3. Press the "Up" and "Down" (Figure 3.2.)arrow buttons simultaneously, as show in the photo above. The Video image will now be able to be viewed through the OTS-X eyepiece and the monitor at the same time.

The user, while looking through the OTS-X eyepiece, will be able to tell if video is being displayed on the monitor, because the VID icon will be visible in the bottom left corner of the eyepiece.

4. To turn off the Remote Video Output, repeat step 3.

NOTE

The image seen in the OTS-X sight will be smaller than its actual resolution, due to the video processing differing from that of a monitor.

To utilize image capture and review follow next:
1. With no menu visible press and hold the “Enter” button until a camera icon appears on screen. (Figure 3.10.)

2. Images are captured by pressing the enter button quickly.

3. To turn off image capture press and hold the “Enter” button until the camera icon disappears from the display. Images can be viewed by entering “Menu 3” (see Screenshot) and view pictures by pressing the up or down arrow buttons. Holding the down button on the “trash can icon” will erase all captured images.

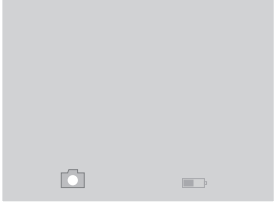

FIGURE 3.10. CAMERA ICON ON SCREEN

How to download images to PC.

1. Install ATN Interface Software on your PC.
2. With OTS-X On plug in image capture cable to OTS-X and PC.
3. Open “ATN Scope Interface” software.
4. Click on menu named: Settings.
5. Select “Connect”
6. Choose the correct port for the OTS-X cable.
7. Click on menu named: Settings.
8. Select “Image Directory”

9. Choose a location to save the images to.

10. Click on menu item “Download Images”

FIGURE 3.11. IMAGE CAPTURE CABLE

3.2.3. HAND-HELD OPERATION

(1) Ensure that the battery are installed per paragraph 2.1.1.

(2) Turn the ON-OFF switch to ON.

NOTE

The sharpest image will be observed only when the objective lens and eyepiece lens are properly focused.

(3) Rotate the diopter adjustment for the clearest view of the image intensifier screen.

(4) The objective lens is set at fixed focus.

3.2.4. PREPARATION FOR STORAGE

(1) Shutdown. Perform the following procedures to shut down the monocular.

(a) Turn the monocular power switch to the OFF position.

(b) Remove the monocular from the headmount, helmet mount or weapon and remove the weapon mount from the monocular.

WARNING

Do not carry batteries in pockets containing metal objects such as coins, keys, etc. Metal objects can cause the batteries

to short circuit and become very hot.

(2) Packaging After Use.

(a) Remove battery cap and remove battery.

(b) Inspect the battery housing for corrosion or moisture. Clean and dry if necessary.

(c) Replace the battery cap.

(d) Remove the demist shield or sacrificial window if installed. Install objective lens cap.

NOTE

• Prior to placing OTS-X into carrying case, ensure OTS-X and case are free of dirt, dust, and moisture.

3.2.5. INTERCHANGEABLE LENSES

The objective lens on the OTS-X unit can be interchanged. To change lenses unscrew current lens counter clockwise and remove. Take desired lens and screw into body clockwise.

FIGURE 3.12. INTERCHANGEABLE LENSES

CHAPTER 4

MAINTENANCE INSTRUCTIONS

4.1. LUBRICATION INSTRUCTIONS

No lubrication is required.

4.2. TROUBLESHOOTING PROCEDURES

4.2.1. TROUBLESHOOTING

Table 4.1. lists common malfunctions that you may find with your equipment. Perform the tests, inspections and corrective actions in the order they appear in the table.

This table cannot list all the malfunctions that may occur, all the tests and inspections needed to find the fault, or all the corrective actions needed to correct the fault. If the equipment malfunction is not listed or actions listed do not correct the fault, notify your maintainer.

TABLE 4.1. OPERATOR'S TROUBLESHOOTING.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Monocular fails to activate.	Visual.	Turn power switch to OFF position and then ON.
	Check for defective, missing or improperly installed battery.	Replace battery or install correctly.
2. Poor image quality.	Check objective lens or eyepiece lens focus.	Re Calibrate/NUC. Refocus.
	Check for fogging or dirt on objective lens or eyepiece lens.	Clean lens surface per paragraph 3.2.
3. Light visible around eyecup.	Check eye relief distance.	Readjust for proper eye relief distance.
	Check eyecup for resiliency.	If eyecup is defective, refer to higher level of maintenance.
4. Diopter adjustment cannot be made.	Check to see if the diopter adjustment is bent or broken.	If damaged, refer to higher level of maintenance.

MALFUNC-TION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Battery cap difficult to open.	Visually inspect for the presence of an o-ring. Check for damaged battery cap.	If o-ring is missing, refer to higher level of maintenance. If damaged, refer to higher level of maintenance.

4.3. OPERATOR'S MAINTENANCE PROCEDURES

4.3.1. CLEANING THE SCOPE

CAUTION

• The monocular is a precision electro-optical instrument and must be handled carefully.

• Do not scratch the external lens surfaces or touch them with your fingers.

Clean monocular with water if necessary and dry thoroughly. Clean lenses with lens paper (and water if necessary).

4.3.2. NECK CORD MAINTENANCE

The neck cord (Figure 1.1.) may be broken, frayed, or loose at one or both ends.

If loose, re-tie cord. If broken or severely frayed, install new cord as follows:

(1) Insert ends through monocular holes from the rear.

(2) Thread right cord end through hole in objective lens cap.

(3) Tie a knot in each end.

For customer service and technical support, please contact

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